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BINDING CONDITION OF THE MANY BODY SEMI-RELATIVISTIC PAULI-FIERZ MODEL

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We consider the quantum system of N-relativistic particles interact with the quantized electromagnetic field and the nuclear potential V. It is assumed that the particles have no spin and are obeying the Boltzmann statistics. If the ground state of the total system $E^V(N)$ satisfy the inequality

$$E^V(N) < \min\{E^V(N-M) + E^0(M) | M = 1, 2, \ldots, N\}, \tag{1}$$

then we say that the binding condition holds. We say that at least one particle is bound if the weaker condition

$$E^N(N) < E^0(N) \tag{2}$$

holds. To prove the condition (1) is important to prove the existence of the ground state. In this talk, we show that at least one particle is bound. The proof is an application of the functional integral representation of the semigroup of the Hamiltonian which is positivity preserving by the assumptions.